上海冠显光电科技有限公司
Shanghai Top Display Optoelectronics Co., LTD

PRODUCTION SPECIFICATION OF AMOLED MODULE

MODULE NO.：TA055FHV03CT

Customer Name:			
Customer Part Number:			
Approved By:		**Date:**	

Prepared By	Checked By	Approved By

Table of Contents

Revision History

Rev	Issued Date	Description	Page	Editor
1.0	Mar. 18, 2020	First release	All	
2.0	Mar. 18, 2020	Thickness		

1 General Specifications

Feature		Specifications
Display Spec.	OLED type	5.44 inch
	Resolution (H*V)	1080 RGB X 1920
	Technology Type	--
	Pixel Configuration	Rendering
	Display Mode	AMOLED
	Viewing Direction	ALL
	Gray Scale Inversion Direction	--
Mechanical Characteristics	OutlineDimensions (W x H x T) (mm)	81(V) X 138.2(H) X 1.7(T)
	Active Area(mm)	67.82(V) X 120.58(H)
	With /Without Touch screen	On cell
	Match Connector Type	FH26-39S-0.3SHW
	Backlight Type	--
	Weight (g)	TBD
Electrical Characteristics	Interface	MIPI DSI 4LANE
	Number of color	16.7M
	Driver IC	OLED: RM67199 Touch:GT1151

Note 1:

2 Pin Assignment

Pin No.	Symbol	I/O	Description
1~3	GND1~GND3	POWER	Ground
4~8	VBAT1~VBAT5	POWER	POWER IC INPUT VOLTAGE
9	GND4	POWER	Ground
10	VPP	POWER	NC
11	NC1		NC
12	GND5	POWER	Ground
13	D3P	I/O	MIPI DSI DATA3+
14	D3N	I/O	MIPI DSI DATA3-
15	GND6	POWER	Ground
16	D0P	I/O	MIPI DSI DATA0+
17	D0N	I/O	MIPI DSI DATA0-
18	GND7	POWER	Ground
19	CLKP	I	MIPI DSI Clock+
20	CLKN	I	MIPI DSI Clock-
21	GND8	POWER	Ground
22	D1P	I/O	MIPI DSI DATA1+
23	D1N	I/O	MIPI DSI DATA1-
24	GND9	POWER	Ground
25	D2P	I/O	MIPI DSI DATA2+
26	D2N	I/O	MIPI DSI DATA2-
27	GND10	POWER	Ground
28	RESX	I	OLED RESET, Low active
29	VDDIO	POWER	Digital I/O power supply, it shall be same with the MIPI I/O voltage of HOST MCU
30	VCI	POWER	Analog power, 3.3V
31	TE	O	Tearing effect output, it can be NC
32	GND11	POWER	Ground.
33	TSP_AVDD_3.3	POWER	Analog power for TP driver IC
34	TSP_DVDD_1.8	POWER	Digital power for TP driver IC
35	TSP_SDA	I/O	IIC_SDA for TP driver IC
36	TSP_SCL	I/O	IIC_SCL for TP driver IC
37	TSP_RESET	I	TP Reset signal, low active
38	TSP_ATTN	I	Interrupt signal for TP driver IC
39	ID	O	NC

3 Absolute Maximum Ratings

GND=0V, Ta= 25℃

Characteristics	Symbol	Min.	Max.	Unit	Notes
Analog power voltage	VCI	-0.3	5.5	V	-
Digital I/O voltage	VDDIO	-0.3	5.5	V	-
Power IC Input voltage	VBAT	-0.3	6	V	-
Operating temperature	TOP	-20	70	℃	
Storage temperature	Tstg	-30	80	℃	

4 Electrical Characteristics

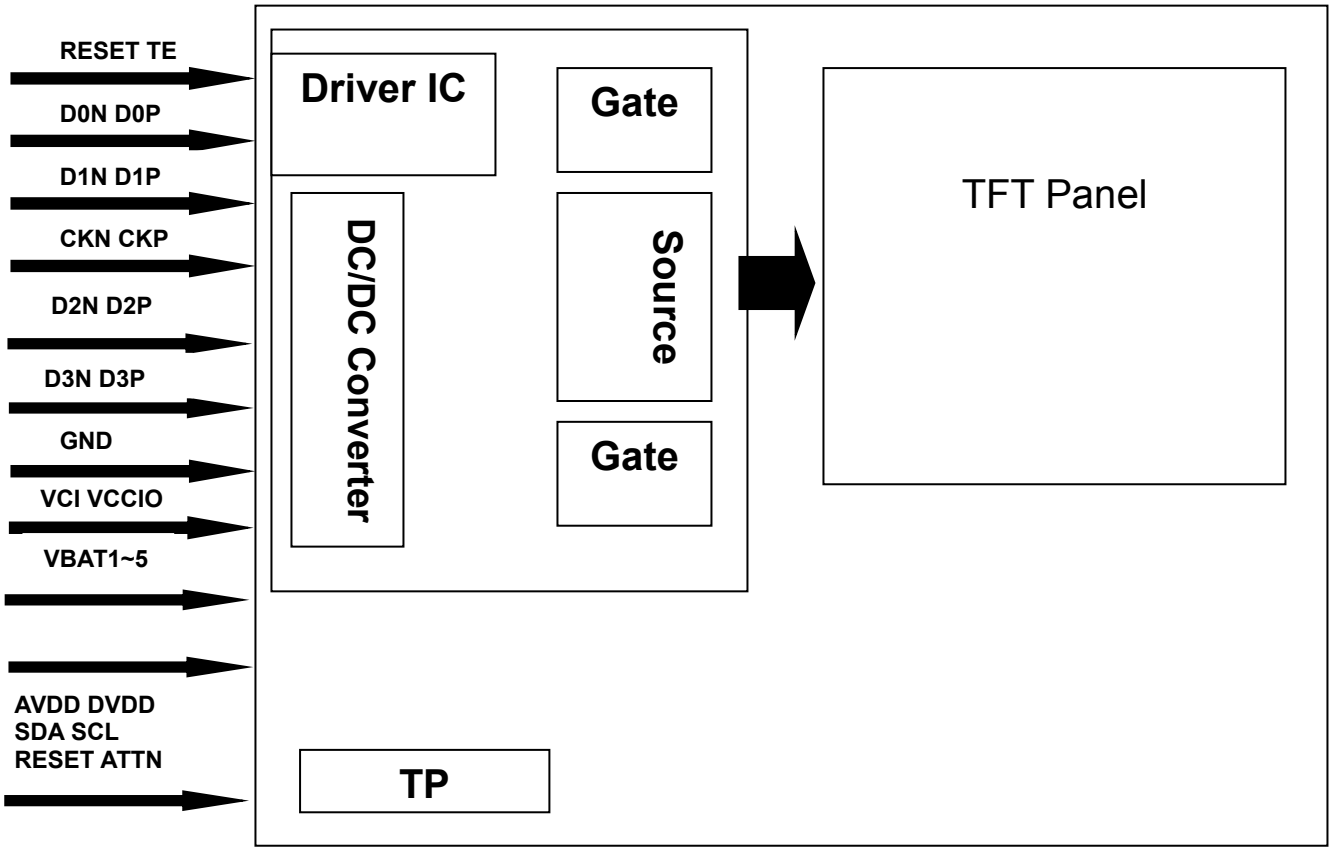
4.1 Electrical Specification

GND=0V, Ta=25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Notes
Analog power voltage	VCI	3.0	3.3	3.6	V	-
Digital I/O voltage	VDDIO	1.65	1.8	3.6	V	-
Power IC Input voltage	VBAT	3.2	3.3	4.5	V	-
Analog power for TP	TSP_AVDD_3.3V	2.8	3.3	3.6	V	-
Digital power for TP	TSP_DVDD_1.8V	1.65	1.8	3.6	V	-

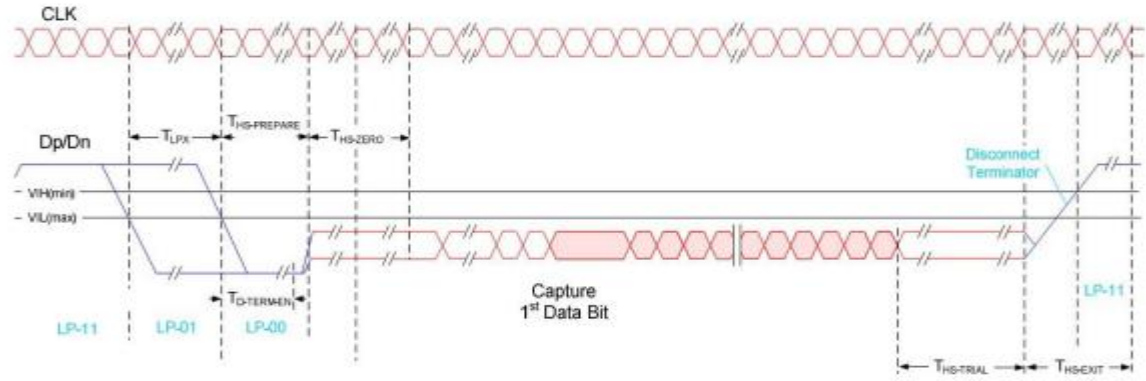
Mode	Symbol	Condition	Min.	Typ.	Max.	Unit	Notes
350 nits @Gray 255	IELVDD/ ELVSS	VELVDD=4.6V VELVSS=-2.5V VCI=3.3V VDDIO=1.8V VSP=6.4V	-	190	230	mA	-
	IVCI		-	2	3	mA	-
	IVDDIO		-	50	55	mA	-
	IVSP		-	15	150	mA	-

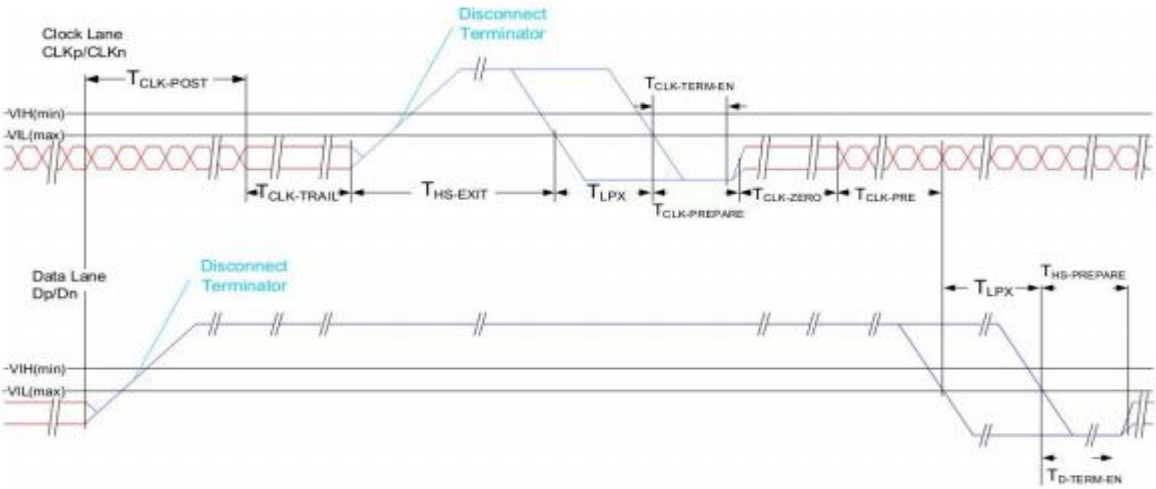
4.2 Block Diagram

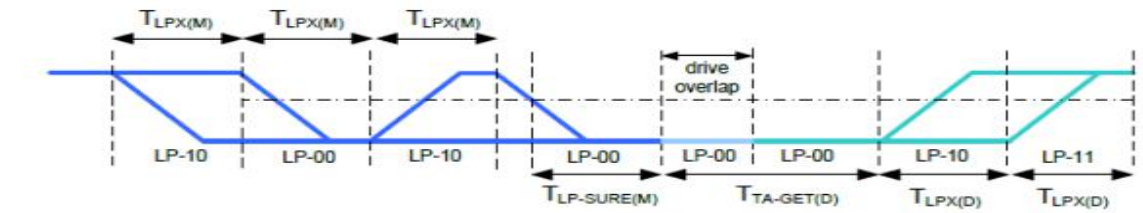


5 INTERFACE TIMING

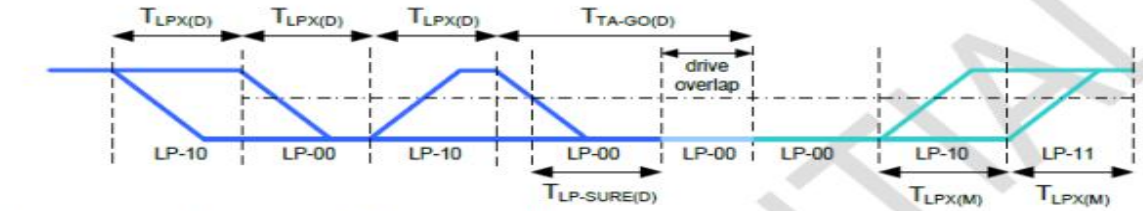
5.1 System Bus Read/Write Characteristics.







Bus turnaround (BAT) from MPU to display module timing



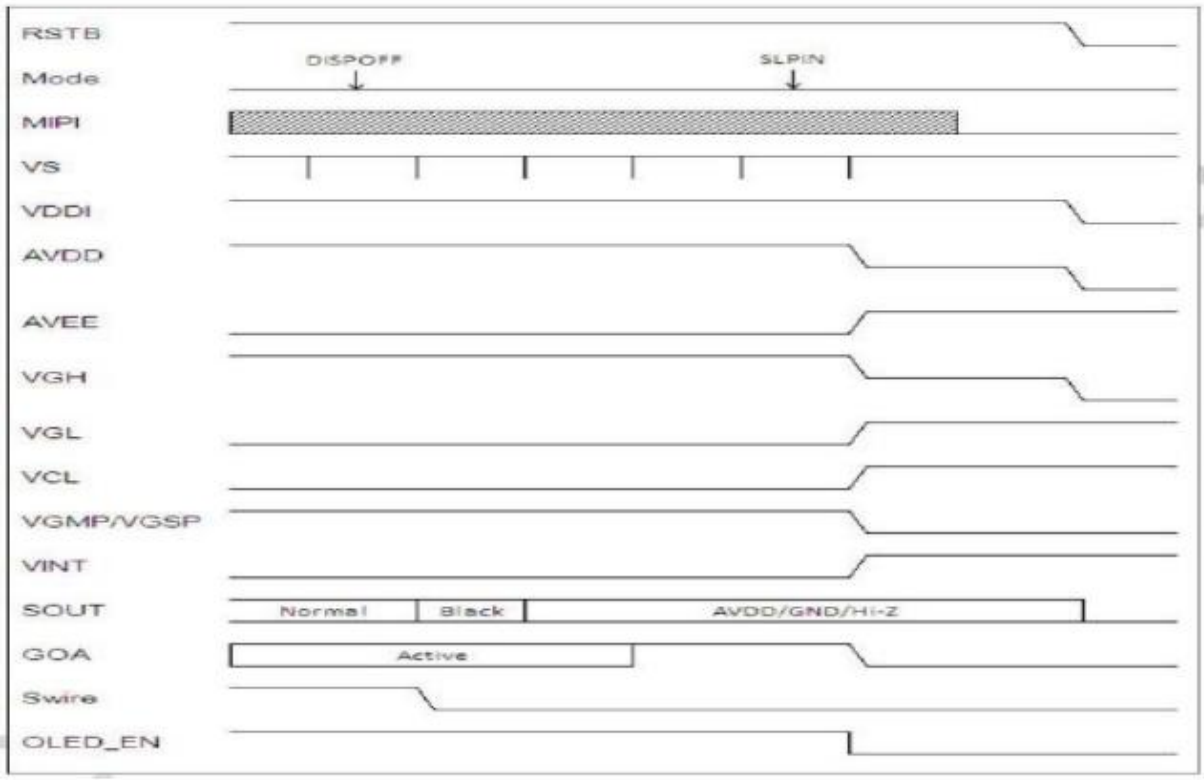
Bus turnaround (BAT) from display module to MPU timing

Timing Parameters:

Parameter	Description	Min	Typ	Max	Unit
$T_{CLK-POST}$	Time that the transmitter continues to send HS clock after the last associated Data Lane has transitioned to LP Mode. Interval is defined as the period from the end of $T_{HS-TRAIL}$ to the beginning of $T_{CLK-TRAIL}$.	60ns + 52*UI			ns
$T_{CLK-TRAIL}$	Time that the transmitter drives the HS-0 state after the last payload clock bit of a HS transmission burst.	60			ns
$T_{HS-EXIT}$	Time that the transmitter drives LP-11 following a HS burst.	300			ns
$T_{CLK-TERM-EN}$	Time for the Clock Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		38	ns
$T_{CLK-PREPARE}$	Time that the transmitter drives the Clock Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission.	38		95	ns
$T_{CLK-PRE}$	Time that the HS clock shall be driven by the transmitter prior to any associated Data Lane beginning the transition from LP to HS mode.	8			UI
$T_{CLK-PREPARE}$ + $T_{CLK-ZERO}$	$T_{CLK-PREPARE}$ + time that the transmitter drives the HS-0 state prior to starting the Clock.	300			ns
$T_{D-TERM-EN}$	Time for the Data Lane receiver to enable the HS line termination, starting from the time point when Dn crosses $V_{IL,MAX}$.	Time for Dn to reach $V_{TERM-EN}$		35 ns +4*UI	
$T_{HS-PREPARE}$	Time that the transmitter drives the Data Lane LP-00 Line state immediately before the HS-0 Line state starting the HS transmission	40ns + 4*UI		85 ns + 6*UI	ns
$T_{HS-PREPARE}$ + $T_{HS-ZERO}$	$T_{HS-PREPARE}$ + time that the transmitter drives the HS-0 state prior to transmitting the Sync sequence.	145ns + 10*UI			ns
$T_{HS-TRAIL}$	Time that the transmitter drives the flipped differential state after last payload data bit of a HS transmission burst	60ns + 4*UI			ns

Parameter	Description	Min	Typ	Max	Unit	Notes
$T_{LPX(M)}$	Transmitted length of any Low-Power state period of MCU to display module	50		**150**	ns	1,2
$T_{TA-SURE(M)}$	Time that the display module waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(M)}$		$2*T_{LPX(M)}$	ns	2
$T_{LPX(D)}$	Transmitted length of any Low-Power state period of display module to MCU	50		**150**	ns	1,2
$T_{TA-GET(D)}$	Time that the display module drives the Bridge state (LP-00) after accepting control during a Link Turnaround.		$5*T_{LPX(D)}$		ns	2
$T_{TA-GO(D)}$	Time that the display module drives the Bridge state (LP-00) before releasing control during a Link Turnaround.		$4*T_{LPX(D)}$		ns	2
$T_{TA-SURE(D)}$	Time that the MPU waits after the LP-10 state before transmitting the Bridge state (LP-00) during a Link Turnaround.	$T_{LPX(D)}$		$2*T_{LPX(D)}$	ns	2

5.2 Power ON/OFF Timing



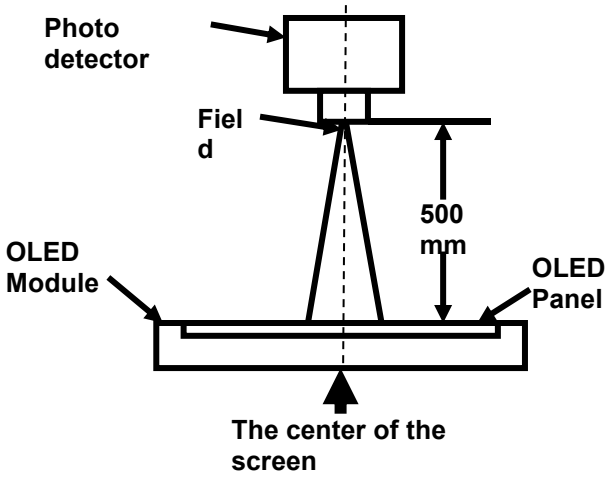
6 Optical Characteristics

Ta=25℃

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles	θT	CR≧10	80	-	-	Degree	Note 2
	θB		80	-	-		
	θL		80	-	-		
	θR		80	-	-		
Contrast Ratio	CR	θ=0°	6000	-	-	-	Note1 Note3
Response Time	T_{ON}	25℃	-	-	-	ms	Note1 Note4
	T_{OFF}						
Uniformity	U	-	75	-	-	%	Note1 Note6
NTSC	-	-	90	105	-	%	Note 5
Luminance	L		280	315	345	cd/m^2	Note1 Note7

Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the OLED screen. All input terminals OLED panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the OLED by CONOSCOPE(ergo-80)。

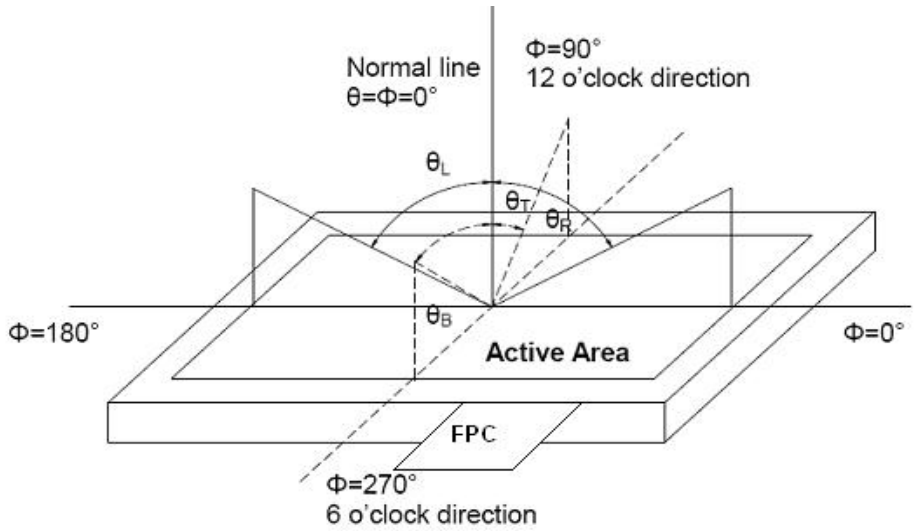


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when OLED is on the "White" state}}{\text{Luminance measured when OLED is on the "Black" state}}$$

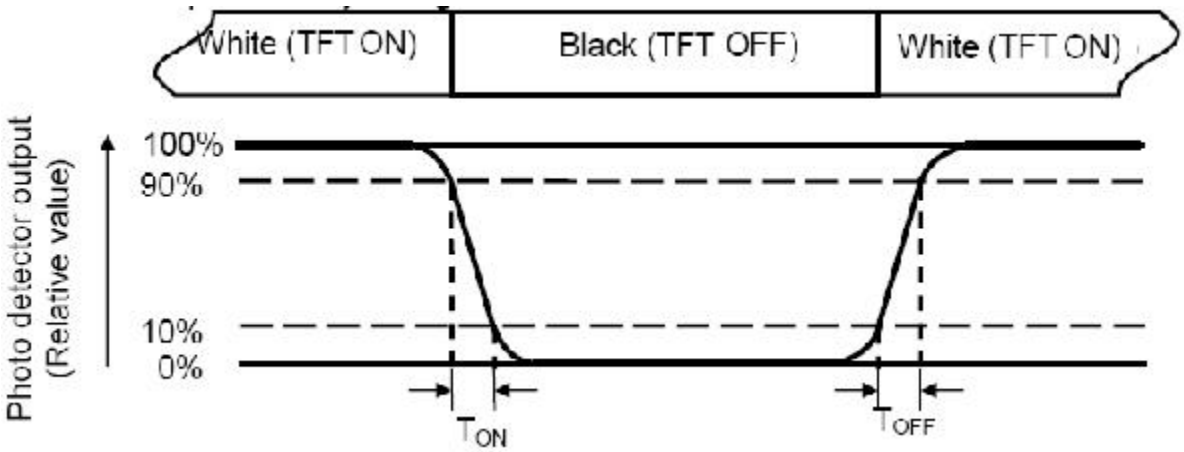
“White state “:The state is that the OLED should be driven by Vwhite.

“Black state”: The state is that the OLED should be driven by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: Definition of Response time

The response time is defined as the OLED optical switching time interval between “White” state and “Black” state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of OLED.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-------Active area length W----- Active area width

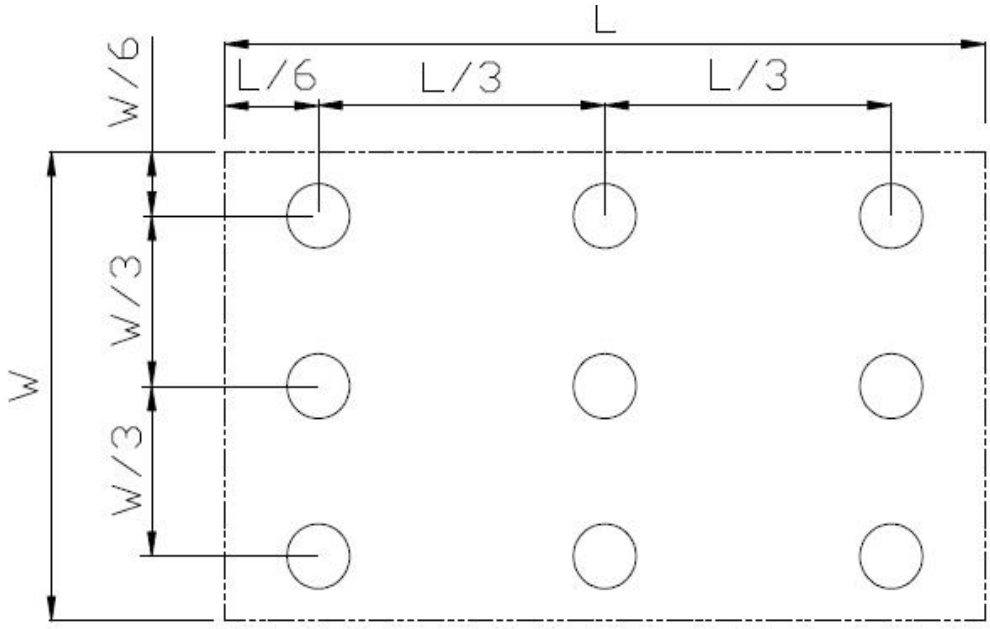


Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.

Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

7 Environmental / Reliability Test

Item	Condition	Time (hrs)	Assessment
High temp. Storage	80°C	120	No abnormalities in functions and appearance
High temp. Operating	70°C	120	
Low temp. Storage	-30°C	120	
Low temp. Operating	-20°C	120	
Humidity	40°C/ 90%RH	120	
Thermal Shock(Non-operation)	-20°C ← 25°C →70°C (0.5 hour ← 5 min → 0.5 hour)	10cycles	

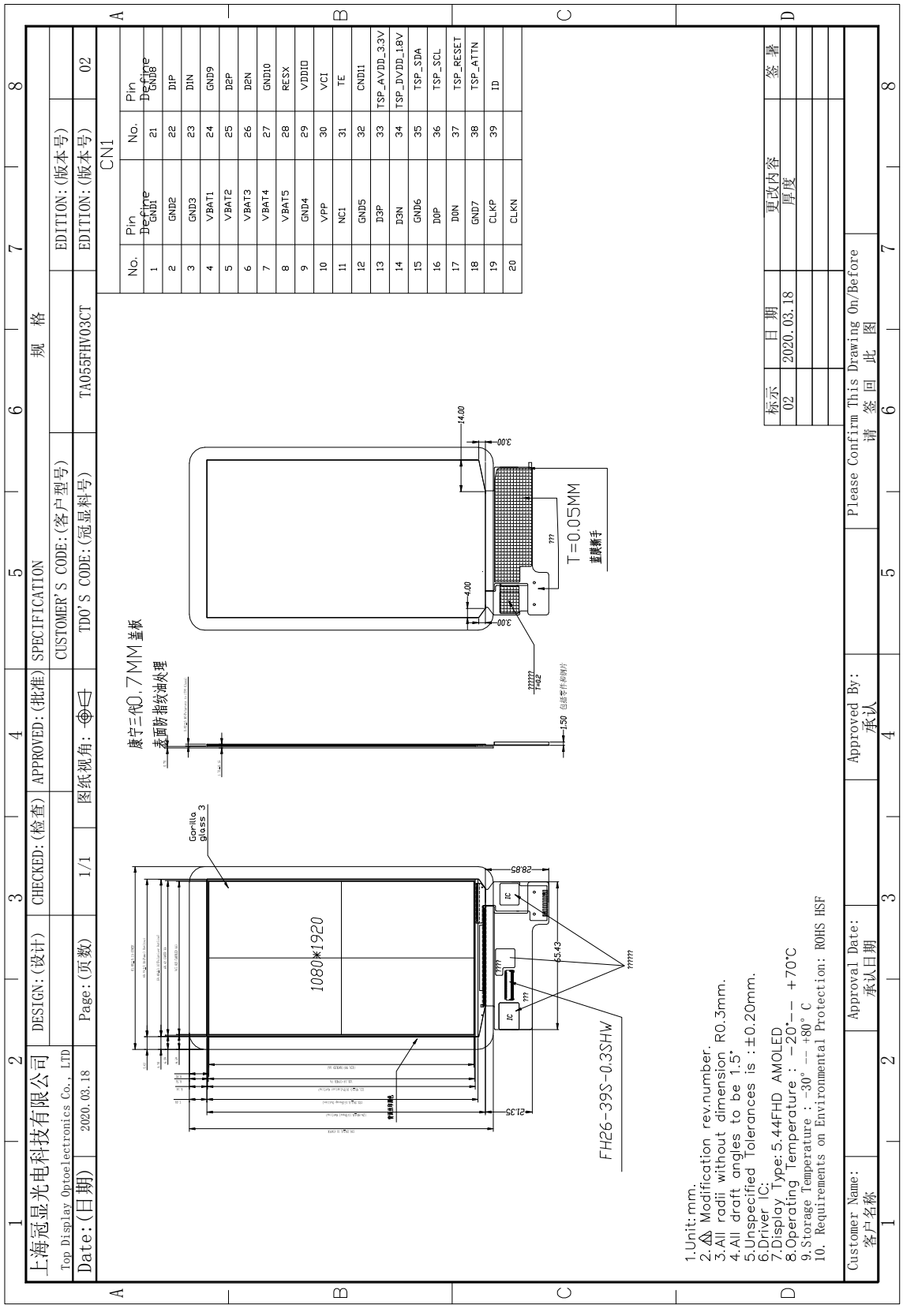
Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 1~10pcs.

3.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

8 Mechanical Drawing



9 Precautions For Use of OLED Modules

9.1 Handling Precautions

9.1.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.1.4 The polarizer covering the display surface of the OLED module is soft and easily scratched. Handle this polarizer carefully.

9.1.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

9.1.1.6 Do not attempt to disassemble the OLED Module.

9.1.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

9.1.1.9 Be sure to ground the body when handling the OLED Modules.

9.1.1.10 Tools required for assembly, such as soldering irons, must be properly ground.

9.1.1.11 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

9.1.1.12 The OLED Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

9.1.1.13 Storage precautions

9.1.1.14 When storing the OLED modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.1.1.15 The OLED modules should be stored under the storage temperature range. If the OLED modules will be stored for a long time, the recommend condition is:

9.1.1.16 The OLED modules should be stored in the room without acid, alkali and harmful gas.

9.2 Transportation Precautions

The OLED modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.